CONSTRUCTION VALUE ENGINEERING PROPOSAL
MISSOURI DEPARTMENT OF TRANSPORTATION

Date May 1, 2008

Contract ID 080229-406 Job No. J4I1923
County Clay Route I-35 Original Bid Cost $1,435,435.35
Contractor Collins & Hermann, Inc. By Jeremy Knernschield
Designed By MoDOT Phone 913-621-3906

VECP 08-43

1. Description of existing requirements and proposed change(s).

Existing Requirements
64,314 LF Misc. High-Tension Socketed Safety Fence, TL-3(15') @ $11.06/LF
Sub-Total **$711,312.84**

Proposed Changes
8,517 LF Misc. High-Tension Socketed Safety Fence, TL-3(15') @ $11.06/LF
$ 94,198.02
55,797 LF Misc. High-Tension Socketed Safety Fence, TL-3(20') @ $10.31/LF
$575,267.07
Sub-Total **$669,465.09**

2. Estimate of reduction in construction cost. **TOTAL SAVINGS $ 41,847.75**

3. Dates of any previous or concurrent submission of the same proposal.

Contract ID	080328-X05
Job No.	J0I0978B
Date	April 29, 2008

MEMORANDUM

Missouri Department of Transportation
Construction & Materials
Cameron

TO: Perry Allen – D4

CC:

FROM: David Scrivens – D1

DATE: May 14, 2008

SUBJECT: VE Proposal – J4I1923
Contract: 080229-406

Attached is the latest VE proposal, with corresponding documentation, for your review and approval.

I've forwarded the same to you via email but this will have my original signature on it.

If you have any questions, give me a call.

DAS

Additional Comments:

*** Portion Below This Line To Be Filled Out by MoDOT ****

Comments:
I recommend approval but have reservations concerning the overall savings. See attached.

Signature: David Scrivens — 05/14/08

Submitted By Resident Engineer — Date

Name: David Scrivens

Comments: - CONCEPT APPROVED AND FENCE INSTALLED, CONTRACTOR NEEDS TO WORK OUT FINAL NUMBERS. QUESTION REMAINS 50/50 OR 75/25

☒ **Approval Recommended**

☐ **Rejection Recommended**

Signature: for VE Elizabeth A. Wright (PUN) — 6/26/08

Name: ELIZABETH A WRIGHT — Date

District Engineer

Comments: APPROVED AS CONCEPT AT ~~AS~~ 50/50. CONTRACTOR NEEDS TO PROVIDE ADDITIONAL DETAIL

☒ **Approval**

☐ **Rejection**

Signature: David D. Goodwin By PHB — 6/30/08

Name: — Date

State Construction and Materials Engineer

Distribution: **Resident Engineer, District Operations Engineer, State Construction and Materials Engineer**
***Value Engineering Administrator - *MoDOT, P.O. Box 270, Jefferson City, MO 65102**

VE Proposal
Collins & Hermann
Contract: 080229-406
Project: J4I1923
Date: 05/14/08

RE recommendation/comments:

I would recommend approval of the proposed VE based on the documentation received from Joe Jones. Please note that my current recommendation comes after a substantial portion of the cable had already been contructed using the proposed 20' post spacing. I've also attached documentation of Collins & Hermann's initial, preliminary, proposal in which they indicated a savings of $80,000. I would question why the total proposed savings has gone from $80,000 to $41,847.75 while the quantity of guard cable (with the new 20' post spacing) has been reduced from 64,314 LF to 55,797 LF. As they have noted, contract 080328-X05 has had a similar VE proposal. I spoke with Brian Holt who indicated that a 50/50 share of the savings was proposed. With this in mind, I would have to inquire as to when the same proposal becomes a "standard practice"? I would recommend a 75/25 split in favor of MoDOT.

David Scrivens

Joseph G Jones/SC/MODOT
04/29/2008 02:50 PM

To David A Scrivens/D1/MODOT@MODOT, Perry J Allen/D4/MODOT@MODOT, Brian N Holt/D10/MODOT@MODOT, Andrew L
cc
bcc
Subject 20 ft. Post Spacing Documentation

After further research and much debate, MoDOT decided to increase the maximum post spacing for high-tension, socketed cable barrier from 15 ft. to 20 ft.

The reasons are as follow:

- Compatibility with Federal approvals
  The FHWA, in a memorandum dated July 20, 2007, states,
  "The FHWA recommends that highway agencies specify the post spacing when cable barrier systems are specified. The conventional range for cable post spacing is 6.5 to 15'."

  Subsequent discussion with FHWA clarified that "conventional range" in no way represents an absolute limit. In fact, another FHWA Document states,
  "...the likelihood of passenger car underrides of any cable system may increase as the post spacing increases, particularly when the barrier is installed on non-level or slightly irregular terrain and the cables are not restrained from lifting at each post. Consequently, some transportation agencies have limited post spacing to approximately 6m (20 feet) for cable barriers."

- Compatibility with existing product line
  Each of the three most likely sources of proprietary cable barrier systems has a product that exhibits a dynamic deflection of less than 10 ft. at 20 ft. post spacing.

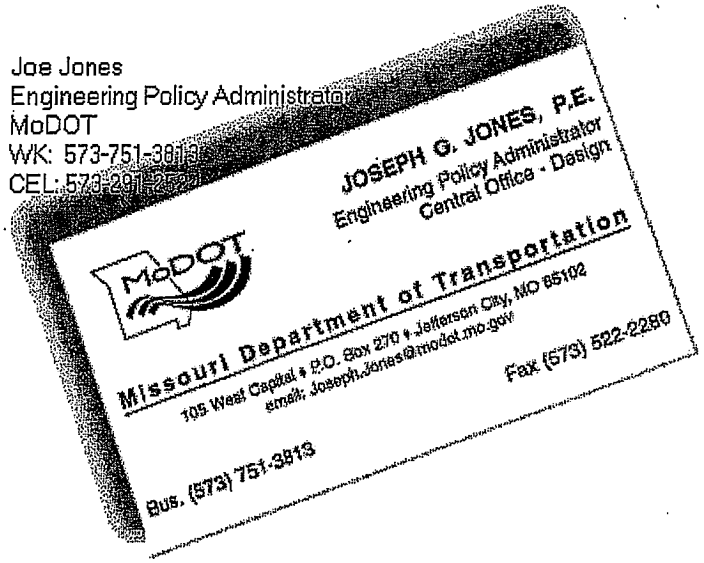
Manufacturer	Post Spacing	Dynamic Deflection
Gibraltar	20 ft.	8 ft.-1 in.
Trinity	20 ft.	9 ft.- 4 in.
Brifen	10 ft.	7 ft. - 7 in.

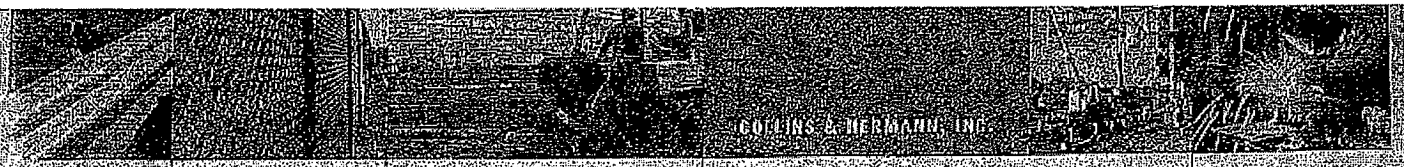
- Excellent In-service performance
  MoDOT has experienced excellent in-service performance from a sizeable installation of high tension barrier, on 4:1 slopes, with posts spaced at 20 ft. Furthermore, MoDOT's low-tension, generic system has proven numbers that indicate a success rate of 94% with posts spaced greater than 15 ft. apart.

- Money saved with the same safety value delivered
  A recent VE proposal to increase post spacing from 15 ft. to 20 ft. showed a savings of $0.75 per linear foot. That equates to about a 7% price reduction for the overall system.

This memo is to document the decision for some pending Value Engineering proposals; the policy change will have to be balloted through the normal process.

Joe Jones
Engineering Policy Administrator
MoDOT
WK: 573-751-3813
CEL: 573-291-2??





Mr. David Scrivens, P.E. April 4, 2008
MoDOT
1505 North Harris
Cameron, Mo 64429
816-632-7304
816-632-1189(fax)

Subject: Value Engineering Conceptual Proposal
Contract ID: 080229-406
Job No.: J4I1923
County: Clay
Route: I-35

Mr. Scrivens:

Please reference Page 3 of the Special Provisions Section D 1.0 Description. In Section D 1.0, the Special Provisions describe the requirements of the High-Tension Cable product used on this project to be approved by the FHA and also in accordance with NCHRP 350, Test Level 3. It goes on to specify that acceptable products shall include a concrete socketed line post system with galvanized high tension cables and anchorages. Those approved systems shall be installed on a 4:1 slope (or flatter) with a maximum deflection of 9 feet (2.74m).

In a letter from April 3, 2006 to Mr. Bill Neusch, of Gibraltar, Mr. John R. Baxter, P.E., Director of Safety Design with the U.S. Department of Transportation of the FHA, responded to Gibraltar's request of acknowledgement and acceptance of test results reported and prepared by Karco Engineering. (Please view attached letter).

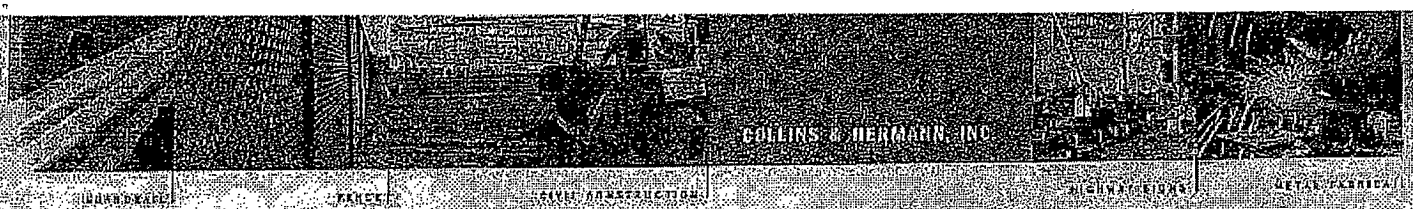
In his letter Mr. Baxter concluded that 20' post spacing to have an approximate deflection of 8 feet. His conclusion coincides and exceeds the requirements and performance described in Section D 1.0 of the Special Provisions.

The existing post spacing requirements for this project state that, "spacing of the post shall not exceed 15'". This proposal is intended to offer a savings based on Mr. Baxter's conclusions.

COLLINS & HERMANN, INC.
www.collinsandhermann.com

St. Louis
1215 Dunn Road
PO Box 3800 (63044)
St. Louis, MO 63138
Phone: 314.869.3000
Fax: 314.869.7418

Kansas City
2165 State Line Road
Kansas City, KS 66103
Phone: 913.621.1500
Fax: 913.621.2233



Unlike guardrail post, cable barrier post hold limited structural value. Cable barrier posts serve to elevate the cable to the required height which allows the cable to safely absorb vehicular impact. The residual monetary advantage of using 20' post spacing in lieu of 15' post is not only initial, but seen throughout the life of the system from continual system maintenance.

The estimated reduction in initial construction will be $80,000.00. As I mention above, those saving are residual and will compound each year.

Based on a monetary advantage, I believe that the proposed changes will lower the over all maintenance of the product and operating cost associated with fewer post.

After you have had the opportunity to review the items reference in this letter, please contact me at your earliest convenience with your decision. I appreciate your time and look forward to working with you on this project.

Cordially,

Jeremy Knernschield
Project Manager/Estimator

COLLINS & HERMANN, INC.
www.collinsandhermann.com/

St. Louis
1215 Dunn Road
PO Box 38901-0901
St. Louis, MO 63138
Phone: 314.869.8800
Fax: 314.869.8408

Kansas City
2906 State Line Road
Kansas City, KS 66103
Phone: 913.621.0906
Fax: 913.621.2231

Form C-104
Rev. 2/01

CONSTRUCTION VALUE ENGINEERING CONCEPT PROPOSAL
MISSOURI DEPARTMENT OF TRANSPORTATION

Date: April 7, 2008

Contract ID: 08C229 - 406 | Job No.: J4I1923

County: Clay | Route: I-55 | Original Bid Cost: $1,435,435.35

Contractor: Collins and Hermann, Inc. | By: Collins and Hermann, Inc.

Designed By: MoDOT | Phone: 913-621-3906

1. Description of existing requirements and proposed change(s). Advantages/Disadvantages:

Please Review The Attached Letter(s).

2. Estimate of reduction in construction costs: $30,000.00

3. Prediction of any effects the proposed change(s) will have on other department costs, such as maintenance and operations:

Please Review The Attached Letter(s).

4. Anticipated date for submittal of detailed change(s) of items required by Section 104.6 of the Specifications:

April 7, 2008
(date)

5. Deadline for issuing a change order to obtain maximum cost reduction, noting the effect of contract completion time or delivery schedule:

April 14, 2008 _____
(date) (effect)

6. Dates of any previous or concurrent submission of the same proposal:

N/A
(date and/or dates)

Additional Comments:

Portion Below This Line To Be Filled Out by MoDOT.

Comments: Based on conversations with Joe Jones in Jeff City, I don't recommend approval. Apparently, testing is currently done on a short track (320') & results may not emulate what could happen in the field. Lloyd Lemire 4-8-08

Submitted By Resident Engineer — Date

Comments:

☐ Approval Recommended

☐ Rejection Recommended

District Engineer — Date

Comments:

☐ Approval

☐ Rejection

State Operations Engineer — Date

Distribution: Resident Engineer, District Operations Engineer, State Operations Engineer, Value Engineering Administrator - *MoDOT, P.O. Box 270, Jefferson City, MO 65102

U.S. Department of Transportation
Federal Highway Administration

400 Seventh St., S.W.
Washington, D.C. 20590

April 3, 2006

In Reply Refer To: HSA-10/B-137B

Mr. Bill Neusch
President
Gibraltar
320 Southland Road
Burnet, Texas 78611

Dear Mr. Neusch:

In your March 2, 2006, letter to Mr. Richard Powers of my staff, you provided summary information on two additional tests you ran on your test level 4 (TL-4) Gibraltar cable barrier system and requested the Federal Highway Administration's (FHWA) acknowledgment and acceptance of the test results. On March 9, 2006, you sent him complete copies of the January 6, 2006, reports prepared by Karco Engineering, LLC (Test Report Nos. TR-P26021-01-A and TR-P26028-01-B) and digital videos that documented the results of these tests. Both tests were run on your TL-4 design in which the cables are 20, 30, and 39 inches above the ground. The support posts were C-posts 3.25 inches by 2.5 inches by 0.15 inches by 4.9-feet long. Each post was set in a 15-inch deep socket placed in a 42-inch deep by 12-inch diameter reinforced concrete footing. The shape and the dimensions of the steel "hairpin" and look plate that hold the cables in place were slightly modified from your earlier design and are shown in Enclosure 1. For both tests, the total installation length was 305 feet and the cables were tensioned to 5700 pounds.

For the first test, the line posts were set on 10-foot centers and the reported dynamic deflection was 6.8 feet. For the second test, the posts were spaced on 30-foot centers, resulting in 9.3 feet of deflection. The summary sheets for both of these tests are shown as Enclosure 2. I concur with the test agency's assessment that both tests met the appropriate evaluation criteria for National Cooperative Highway Research Program Report 350 test 3-11, and either design may be used on the National Highway System when such use is acceptable to the contracting agency. In your March 29, 2006, follow-up letter, you requested confirmation that either 6.25-foot long posts (for TL-3) or 7-foot long C-posts (for TL-4), driven directly into the soil to a depth of 42-inches, could be used as an alternative to the tested socketed posts. Since the longer posts were successfully used in the June 20, 2005, TL-3 test referenced below and in your earlier TL-4 test, I agree that either the driven or the socketed post design may be used.

Based on a straight-line interpolation of the dynamic deflection distances noted above, you also requested FHWA concurrence in assumed deflections based on intermediate post spacings, i.e., post spacings *between* 10 feet and 30 feet. In reviewing our earlier acceptance letters for the

Gibraltar system, we noted that for your original TL-3 design with a 15-foot post spacing, the reported dynamic deflection was approximately 8.5 feet. A test conducted for you by Karco on June 20, 2005, on a slightly modified design resulted in a reduced dynamic deflection of 7.75 feet. Because both test installations were shorter in those tests (only 200 feet) and the tension in the cables was less (4800 lbs.), a direct comparison with your two recent tests cannot be made. However, the predicted deflections based on a straight-line interpolation between the 10- and 30-foot post spacing deflections appear reasonable. Thus, with your TL-4 design, the assumed deflections with a 12-foot post spacing would be approximately 7 feet, those with a 20-foot spacing would be approximately 8 feet, and those with a 30-foot spacing would be approximately 9 feet.

As noted in my original acceptance letter B-137, dated June 13, 2005, dynamic deflection distances based on a single standardized test are not precise and represent only an approximation of what is likely to be seen in the field. Many deflections will be less, but some will be significantly greater, depending on actual crash conditions. Assuming test deflections are accurate to the nearest inch and designing a barrier installation accordingly presumes a degree of precision that simply does not exist. To increase the factor of safety afforded the motoring public, the available deflection distance should exceed the design deflection distance for a flexible or semi-flexible barrier system whenever practicable.

Sincerely yours,

/original signed by/

John R. Baxter, P.E.
Director, Office of Safety Design
Office of Safety

2 Enclosures

VALUE ENGINEERING CHECK SHEET

TYPE OF WORK

(Check one that applies)

- ☐ Bridge/Structure/Footings
- ☐ Drainage Structures (RCP, RCB, CMP's, ect.)
- ☐ TCP/MOT
- ☐ Paving (PCCP, ect.)
- ☐ Grading/MSE Walls
- ☐ Signal/Lighting/ITS
- ☒ Misc. __Guard Rail_____

SUMMARY OF PROPOSAL

(If needed, condense summary to a couple of lines)

___Modify post configuration for guard cable installation_____

SCANNING OF DOCUMENT

If the proposal is large, please mark or make note, which pages need to be scanned into the database. If there are special instructions, make note of them here.

_____Proposal is not lengthy